REMARKS

This amendment is responsive to the Office Action of March 12, 2007. Reconsideration and allowance of claims 2-5 and 7-21 are requested.

The Office Action

Claims 1-6 and 14 stand rejected under 35 U.S.C. § 102 as being anticipated by Petropoulos (US 6,788,057).

Claims 1-6, 11, and 14 stand rejected under 35 U.S.C. § 102 as being anticipated by Vavrek (US 2004/0189298).

Claims 7-10 and 12-13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Vavrek in view of Matone (US 2005/0035764).

The References of Record

Petropoulos is directed to a head coil which uses an X gradient coil which has planar portions **20** on either side which always are used together to generate a gradient across the imaging volume. Similarly, the Y primary coil-like element includes planar elements **22** disposed on opposite sides of the imaging region to generate a Y gradient. The X and Y primary coil-like elements have a single linearity volume. Petropoulos does not suggest changing the linearity volumes by using different combinations of X or Y coil-like elements.

Further, Petropoulos does not disclose the specific layering arrangements discussed in detail in several of the claims.

Vavrek does disclose a dual field-of-view coil assembly. However, Vavrek specifically teaches that the configuration of Figure 7 is undesirable and that, one should eliminate coils in order to achieve the configuration of Figure 8 or Figures 9 or 10. In Figure 8, the inner Z gradient coil is the innermost coil and does not have X or Y coils of a smaller diameter inside of it. Figures 9 and 10 are similar.

Matone in Figure 3 discloses conductive strips **212** (paragraph [0019]). These copper strips **212** define one or more windings of an inner primary gradient coil **112**, **212**. A primary gradient coil typically includes X, Y, and Z coils/windings which are not discussed in Matone. This primary gradient coil **212** includes a spiral winding with a tubular hollow area through it (paragraph [0009]) to permit a

continuous flow of coolant. The cooling passages define several parallel cooling circuits (paragraph [0020]).

The cooled gradient coil **212** is disposed innermost surrounded by an epoxy layer **223**, a fiberglass reinforced plastic cylinder, another epoxy layer **225**, and an outer shield gradient coil **214**. The placement of the cooled gradient coil innermost helps prevent the patients from becoming uncomfortable during testing (paragraph [0022]).

As indicated in paragraph [0025], the coolant which cools the self-shielded gradient coil **210** travels through cooling tubes **232** to absorb heat. It is submitted that the parallel cooling passages flow among the conductive strips that define the X, Y, and Z gradient coil windings of the inner primary winding **212**.

Moreover, there is no suggestion that the Z gradient coil windings of the inner windings should be tubular to be cooled directly while the X and Y gradient coil windings (some of which are closer to the patient) are cooled indirectly.

<u>The Claims Distinguish Patentably Over the References of Record</u>

Claim 7 has been placed in independent form. Claim 7 calls for at least two X coil-like elements and at least two Y coil-like elements which have mutually different linearity volumes by themselves or in combination with each other. Such coils are not shown or fairly suggested by Petropoulos.

Claim 7 further calls for the Z gradient coil to be placed between at least two X primary coil-like elements and at least two Y coil-like elements. Vavrek, in paragraph [0050], rejects the Figure 7 configuration in favor of the configuration of Figure 8, which enhances gradient coil assembly. Further, as Vavrek points out in [0051], the Figure 8 configuration also reduces the amount of needed power. Paragraph [0052] indicates that Figure 8 is further advantageous because there is less thermal resistance to the heat generated in the coil and more heat can be extracted. The assemblies of Figures 9 and 10 have similar advantages. In Figure 8, the primary Z coil **198** is the innermost coil. It is not disposed between X and Y coils. The primary Z coil **198** is also disposed innermost in Figures 9 and 10.

Matone calls for cooling the innermost gradient coil **212** in order to remove heat from the gradient coils and make the patient more comfortable during

imaging (paragraph [0022]). But in Matone, the inner coil **212** appears to be the primary gradient coil assembly which one would expect to include X, Y, and Z windings. Coil **200** is self-shielded suggesting the outer coil **214** is the shield coil assembly. Matone makes no suggestion of coiling the Z winding directly and the X and Y windings indirectly.

Thus, Matone teaches only that the primary coil assembly should be cooled. There is no suggestion in either Vavrek or Matone that the Z coil should either be moved outward and placed between X and Y primary coil-like elements or that such a more radially intermediate coil should be cooled.

Accordingly, it is submitted that **claim 7 and claims 2-5 and 8-13 dependent therefrom** distinguish patentably and unobviously over the references of record.

Claim 8 emphasizes that at least one X and at least one Y primary coil-like element is disposed on one side of the Z primary coil-like element and at least one X primary coil-like element and at least one Y primary coil-like element is placed on the other side of the Z primary coil-like element. Again, this sandwich configuration is not shown or fairly taught by the references of record.

Claim 15 calls for both the primary and the shield coils to have a Z coil with both an X and a Y winding around it and another X and Y winding inside of it. Vavrek teaches against such a structure. Matone does not disclose any details of the X, Y, and Z coil stacking arrangements. Petropoulos places a planar Z coil below the patient, and planar X and Y gradient coils on the left and right sides of the patient.

Accordingly, it is submitted that **claim 15 and claims 16-19 dependent therefrom** distinguish patentably and unobviously over the references of record.

Claim 16 calls for cooling primary and shield Z coil-like elements. Matone describes inner coil **212** as being the primary gradient coils and gradient coils **214** as being the shield gradient coils which together form a self-shielded gradient coil assembly **200** (paragraph [0017]). While Mantone calls for a coolant passage through the inner or primary gradient coil, it is unclear whether the coolant is passing through an X, Y, or Z gradient coil or whether it is just passing through an epoxy potted structure which holds the X, Y, and Z primary gradient coils.

Moreover, claim 16 calls for cooling the Z shield coil-like element. Matone does not cool the shield gradient **214** and makes no suggestion for doing so. Indeed, cooling the shield gradient coil does not appear to be significant for maintaining patient comfort.

Claims 17 and 18 call for changing the linear volume by reversing the polarity of the second X and Y primary coil-like elements. None of the references cited by the Examiner teach or fairly suggest this concept.

New independent **claim 20** has been added to claim the present concepts more fully. Accordingly, it is submitted that **claim 20 and claim 21 dependent therefrom** distinguish patentably and unobviously over the references of record.

Substitute Drawings

As requested by the Examiner, the applicants enclose a substitute Figure 1 in which the boxes have been labeled and in which Figure 1 has been labeled "prior art". An early indication of the acceptability of the drawings is requested.

CONCLUSION

For the reasons set forth above, it is submitted that claims 2-5 and 7-21 distinguish patentably over the references of record and meet all statutory requirements. An early allowance of all claims is requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case, she is requested to telephone Thomas Kocovsky at (216) 861-5582.

Respectfully submitted,

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